

### **REMARKS**

The Office Action of January 5, 2009, has been considered by the Applicants. Claims 1 and 22 are amended. New claim 24 is added. Claims 1, 2, and 21-24 are pending. Reconsideration of the Application is requested.

Claims 1 and 22 were rejected under 35 U.S.C. §§ 102(b)/103 as allegedly being anticipated by or obvious over Guzairova (SU1640136).

Claims 21 and 23 were rejected under 35 U.S.C 103(a) as allegedly being obvious over Guzairova.

Applicants traverse these two rejections together.

Independent claims 1 and 22 have been amended to remove zinc from the list of doping materials. Thus, not all claim limitations are met. There appears to be no motivation based on Guzairova alone to replace the disclosed zinc or magnesium with copper, manganese, nickel, cobalt, or iron. Thus, the claims are not obvious.

In addition, Applicants submit that Guzairova is being read too broadly by the Examiner. Guzairova discloses that the photochemical activity of titania can be reduced by the use of sodium aluminate solution containing zinc or magnesium compounds. Applicants do not believe that the loss of photocatalytic activity in the present claims can be equated with the loss of photochemical activity. Photocatalytic activity refers to the acceleration of a photoreaction due to the presence of a catalyst. Photochemical activity refers to a reaction that proceeds by absorption of light energy. In other words, Guzairova's titania may not have photochemical activity, but still be capable of having photocatalytic activity.

Applicants request the withdrawal of the 102(b) and 103(a) rejections based on Guzairova.

Claims 1, 2, and 21 were rejected under 35 U.S.C 103(a) as allegedly being obvious over Ogata (US Patent No. 6,099,969) in view of Oishi (US Patent No. 5,935,717).

Claims 1, 2, and 21 were further rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Ogata in view of Murasawa '937 (US Patent Pub. No. 2001/0046937).

Applicants traverse these two rejections together.

Ogata does not appear to be combinable with Oishi or Murasawa '937. As the Examiner noted, Ogata uses an amorphous titanium peroxide that has substantially no photocatalyst function. However, both Oishi and Murasawa '937 appear to require a titanium oxide that has photocatalyst function. See column 4 of Oishi, abstract of Murasawa '937. Thus, the combination does not appear to be disclosed or suggested by the references themselves.

The Examiner cites Oishi as teaching copper as a catalyst for enhancing the antibacterial and cleaning effects. Oishi does not appear to make this disclosure. Instead, Oishi states at column 4, lines 28-32, "The crystal system of titanium oxide of an anatase type exhibits a high anti-bacterial effect due to the excellent photoelectric current properties thereof." In other words, these effects are due to the titanium oxide, not the copper. As established above, Ogata's amorphous titanium peroxide does not have a photocatalyst function. Because Ogata and Oishi contradict each other as to what type of titanium oxide should be used, there appears to be no motivation to combine these references and no reasonable expectation of success in a combination.

Applicants request withdrawal of the rejections based on Ogata with Oishi or Murasawa '937.

Claims 22 and 23 were rejected under 35 U.S.C 103(a) as allegedly being obvious over Ogata in view of Oishi, Guzairova, Nakao (JP 11-286619), and Murasawa '346 (US Patent No. 6,277,346).

Claims 22 and 23 were rejected under 35 U.S.C 103(a) as allegedly being obvious over Ogata in view of Murasawa '937, Oishi, Guzairova, Nakao, and Murasawa '346.

Applicants traverse these two rejections together.

Applicants submit that unexpected results occur in the present claims. In particular, as explained in the paragraph on the top of page 5, there are four types of titanium dioxide: anatase, brookite, rutile, and amorphous. Anatase, brookite, and rutile titanium oxide have photocatalytic activity. However, as explained on page 7-8 of the specification, the photocatalytic activity is no longer exhibited after doping in the present application.

As the Examiner noted, Ogata uses amorphous titanium oxide due to its lack of photocatalytic activity. Claim 22 excludes the amorphous type from being used. Thus, one of ordinary skill in the art would expect that a composition of claim 22 has photocatalytic activity. However, it does not.

Murasawa '937, Murasawa '346, and Nakao do not correct the deficiency in this combination of references. According to the Examiner, it would be obvious to form the non-photocatalytic layer of Ogata with the treated rutile titanium oxide having no photocatalytic function disclosed by the two Murasawa references. Alternatively, it would be obvious to use the polymer-coated titanium oxide particles of Nakao in the non-photocatalytic layer of Ogata

However, Ogata attributes the advantageous properties of his coating agent to the use of the amorphous type. See column 2, line 64 to column 3, line 6. In other words, Ogata teaches against replacing the amorphous type with any other type of titanium oxide. Please note that Ogata does not attribute his advantageous properties to the fact that the titanium oxide has no photocatalyst function. Indeed, Ogata suggests adding anatase or rutile titanium oxide to provide a photocatalytic function. See column 5, lines 41-50.

As a result, these claims are not obvious over the combination of cited references. Applicants request withdrawal of these two § 103(a) rejections.

**CONCLUSION**

For the above reasons, all pending claims (1, 2, and 21-23) are in condition for allowance. Withdrawal of the rejections and issuance of a Notice of Allowance is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he is hereby authorized to call Jay F. Moldovanyi, at telephone number 216-363-9000, Cleveland, OH.

It is believed that no fee is due in conjunction with this response. If, however, it is determined that fees are due, authorization is hereby given for deduction of those fees, other than the issue fees, from Deposit Account No. 06-0308.

Respectfully submitted,

FAY SHARPE LLP

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Date

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	Signature: <u>Lynda S. Kalembe</u>
Date: <u>05-05-09</u>	Name: Lynda S. Kalembe

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